GUIDE TO THE RECOGNITION

OF THE

PRINCIPAL ORDERS OF CRYPTOGAMS

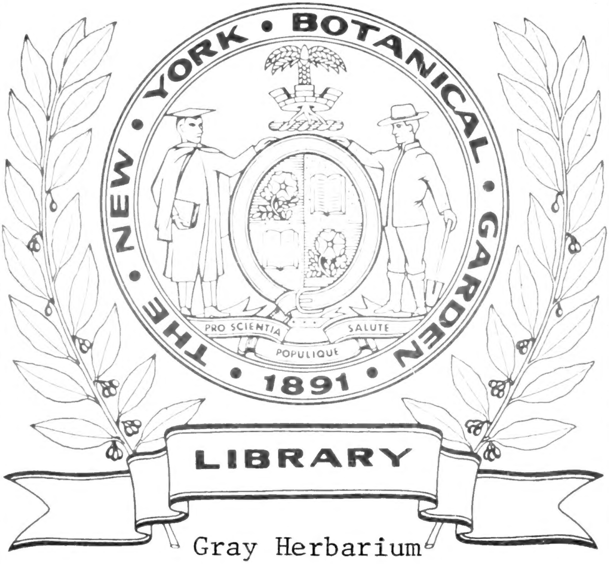
AND THE

COMMONER AND MORE EASILY DISTINGUISHED

NEW ENGLAND GENERA.

BY

FREDERICK LEROY SARGENT.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NEW ENGLAND GENERA.

With a Full Glossary.

BY

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PREFACE.

THIS little book has been prepared for the use of students in the Summer Course in Botany at Harvard University.

There have appeared within the last few years several excellent text-books by Sachs, Bessey, and others, in which more or less space is given to a general consideration of various groups of Cryptogams. Most of us who have tried to combine field-work with the study of these books have been met by the difficulty of recognizing plants belonging to the genera spoken of. For example, to know a Boletus at sight requires a knowledge of the distinctive characters of the genus; and these are not given in the books just mentioned, but must be sought for in special works not always easy to obtain.

In writing this book the attempt has been made to bring together in systematic form and in a convenient shape such information as would enable a student to learn to recognize a number of the commoner conspicuous genera of Cryptogams.

As it is thought that all who use this book will have a copy of Gray's Manual, it has been deemed unnecessary to include the Ferns and their allies. In the several orders of Thallophytes where the genera have not been given, this has been because the characters are entirely, or almost entirely, microscopical. In drawing up the characters it has been necessary in most cases to presume that the student has for study a complete specimen, and has made out all of its characters which are to be seen with the aid of a simple microscope magnifying twenty or thirty diameters. In a few cases the use of a compound microscope magnifying one or two hundred diameters is required, but the manipulations called for are mostly very easy. As with synopses in general, so here, much may often be done when certain characters mentioned are unknown, provided the plant in hand agrees perfectly with the description in the great majority of its characters. When such is the case, the genus in question will probably be the one to which the plant belongs. It is believed that the synopsis here offered may be relied on for accuracy to the extent that any plant agreeing in all particulars with the characters limiting a given genus, belongs to that genus. In the arrangement adopted, convenience has been the chief guide, and this has often led to very artificial groupings.

It is but fair that students using such a book as this should not expect too much of it. In the first place, the plants dealt with are inherently difficult, and it is beyond the power of a book to make them easy. In the second place, the restrictions imposed on the book by the end in view have necessitated many omissions. Furthermore, it is to be expected that use in the field and laboratory will bring to notice points calling for improvement. If the book assists the student in his early efforts to recognize the genera of Cryptogams, it will accomplish what it is intended for.

While the genera selected are all to be found in New England, they are by no means confined to this part of the

country, but in the majority of cases they occur over the greater part of the United States and Europe.

Below are given the names of the authorities from which this book is compiled. Very often characters have been copied *verbatim*, and in no case have quotation marks been used.

Manual of the Mosses of North America, by Leo Lesquereux and Thomas P. James. Boston, 1884.

Descriptive Catalogue of the North American Hepaticæ North of Mexico, by Lucien M. Underwood. Illinois, 1883.

Marine Algæ of New England and Adjacent Coast, by W. G. Farlow. Washington, 1881.

Die Pilze Deutschlands, Oesterreichs und der Schweiz. Georg Winter. Leipzig, 1884.

A Synopsis of the North American Lichens, by Edward Tuckerman. Boston, 1882.

Handbuch der Systematischen Botanik. Chr. Luerssen. Leipzig, 1879.

The student is recommended to consult these works for further information regarding their respective groups. The bibliographical references to be found in these works will lead a student to original authorities. Students will find the illustrations in Bessey's Botany or Sachs's Textbook frequently of service in connection with the glossary of this book.

The book is bound with blank interleaves for the convenience of students wishing to insert notes and sketches.

Cambridge, Mass., June, 1886.

GUIDE TO CRYPTOGAMS.

GRAND DIVISIONS OF THE VEGETABLE KINGDOM.

Sub-Kingdom **CORMOPHYTA**. Plants in which (with few exceptions) there is a well-marked differentiation into caulome and phyllome. Life-history of the individual exhibiting more or less distinctly an alternation of generations — a sexual generation and a non-sexual generation — each of which develops from a single cell formed by the other.

Branch PHANEROGAMIA. Producing seeds. Fibro-vascular bundles present. (See Gray's Manual.)

Branch PTERIDOPHYTA. Not producing seeds. Fibro-vascular bundles present. (See Gray's Manual.)

Branch BRYOPHYTA. Not producing seeds. Fibro-vascular bundles absent. (See page 10.)

Sub-Kingdom **THALLOPHYTA**. Plants in which there is no well-marked differentiation of caulome and phyllome. Life-history of the individual never exhibiting a true alternation of generations.

Group ALGÆ. Provided with chlorophyll, which in some cases is marked by other coloring matters. Mostly aquatic, or growing in moist situations. Never truly parasitic or saprophytic. Of rather slow growth. (See page 18.)

Group FUNGI. Destitute of chlorophyll. Either parasitic or saprophytic. Of rapid growth. (See page 21.)

Group LICHENES. Vegetable growths consisting of a fungus parasitic on algæ imprisoned among its tissues, the two kinds of plants leading a symbiotic existence. The composite thallus epiphytic, of slow growth. (See page 29.)

BRYOPHYTA. Orders:

1 a. *Plant body consisting of a stem bearing leaves radially disposed; branching scarcely ever truly dichotomous. Sporogonium having the capsule covered by a hood-like calyptra; elaters none.*

BRYACEÆ. (True Mosses.) Plants generally low and tufted. Stems simple or branched. Leaves costate or ecostate, never with the cells as in Sphagnaceæ. Capsule of various forms, with a lid, orifice with a peristome or rarely naked. (See page 11.)

SPHAGNACEÆ. (Peat Mosses.) Plants soft and flaccid, usually of comparatively large size; growing mostly in tufts or patches in bogs or wet places. Main stem mostly undivided, bearing copious lateral branches. Leaves ecostate, translucent, formed of two kinds of cells: (1) large hyaline ones; (2) smaller chlorophyllose ones which form a network of rhomboidal or hexagonal meshes around the former. Capsule globose, with a lid, orifice naked. (See page 16.)

1 b. *Plant body consisting of a stem bearing leaves disposed bilaterally, or of a thallus; in both cases there is a marked difference between upper and under surface; branching always dichotomous. Sporogonium with the calyptra as a sheath at the base; elaters present (except in Ricciaciæ).*

JUNGERMANNIACEÆ. (Scale Mosses.) Plant-body consisting of a stem bearing leaves or of a more or less branched thallus. Capsule usually spherical and long stalked, opening by four valves; columella wanting. (See page 16.)

ANTHOCEROTACEÆ. (Hornworts.) Plant-body an irregularly branching thallus. Capsule two-valved at maturity; columella present. (See page 18.)

MARCHANTIACEÆ. (Liverworts.) Plant-body a dichotomously or radiately branched thallus, scaly beneath. Capsule spherical, short stalked, opening irregularly or by imperfect valves; often pendant from the under surface of a carpocephalum. Columella wanting. (See page 18.)

RICCIACEÆ. (Crystalworts.) Plant-body a dichotomously branched thallus, usually scaly beneath. Capsule immersed in the thallus or sessile on its surface, indehiscent; columella wanting. (See page 18.)

BRYACEÆ. Genera:

1 a. *Fruit acrocarpous.*
  2 a. *Mouth of the capsule naked.*
    3 a. *Lid broadly convex, not beaked.*

Hedwigia. Stem forking, radiculose at base. Leaves 8-ranked, opaque. Capsule short-stalked, immersed in the perichætium, globose. Calyptra minute, barely covering the lid, fugacious.

    3 b. *Lid with a long straight beak.*

Physcomitrium. Plants simple or sparingly branched at the base by innovations. Capsule globose or turbinate, stalked, immersed, or exserted. Calyptra 5-lobed at base, descending to middle of capsule, not hairy.

  2 b. *Mouth of the capsule with teeth.*
    4 a. *Peristome single.*
      5 a. *Teeth* 4.

Tetraphis. Stems a third or more as long as the fruit-stalks. Calyptra conical mitrate, covering the capsule to the middle.

      5 b. *Teeth* 8 *or* 16.
        6 a. *Calyptra mitriform.*
          7 a. *Calyptra plicate.*

Orthotrichum. Plants pulvinate, rooting at base in the axils of branches. Leaves hyaline in the lower part. Capsule mostly immersed and 8—16 striate when dry, often twisted. Calyptra campanulate, often hairy. Teeth 8 or 16.

          7 b. *Calyptra not plicate.*

Grimmia. Plants more or less compactly cespitose or pulvinate, radiculose only at the base. Stem repeatedly forking. Leaves opaque, close, open, rarely secund, lanceolate, margin mostly entire, rarely erose-denticulate at the apex, often tipped with a whitish hair. Capsule emerging. Teeth lanceolate, purple, hygroscopic. Calyptra often hairy.

6 b. *Calyptra cuculliform.*
8 a. *Leaves 2-ranked.*

Fissidens. Leaves conduplicate below, alate on the back, the upper part expanded into a simple vertical lamina, with a percurrent or excurrent costa. Lid and peristome as in Dicranum.

8 b. *Leaves spreading every way.*
9 a. *Capsule cernuous and inclined, unequal.*
10 a. *Capsule with a long narrow collum.*

Trematodon. Plants loosely cespitose, short, sparingly branched. Leaves lanceolate-subulate, costate, cells large, especially at the base. Capsule long-stalked, oblong, slightly arcuate. Teeth 16. Narrowly lanceolate, cleft to near the base, or lacerate, purple. Lid long-subulate.

10 b. *Capsule with a short broad collum.*
11 a. *Capsule when ripe, greenish, surface smooth.*
12 a. *Plants loosely cespitose, green, sometimes yellowish, not spongy.*

Dicranum. Stem usually once or more forked, radiculose at base, or covered thickly for its whole length with radicles. Leaves spreading, mostly secund, lanceolate-subulate or long-lanceolate, costate, cells at the basal angles often larger and colored. Teeth 16, bifid, purple at base. Lid subulate-beaked.

12 b. *Plants densely cespitose or pulvinate, whitish, spongy like Sphagnum, soft when moist, brittle when dry.*

Leucobryum. Leaves close, thickish. Capsule, peristome and lid as in Dicranum. Calyptra large, whitish.

11 b. *Capsule when ripe very dark red, striate and deeply furrowed.*

Ceratodon. Plants cespitose or pulvinate, green, sometimes yellowish. Stem dividing by innovations from under the perichætium. Leaves lanceolate-subulate, clasping at base, spreading, with a strong percurrent costa. Capsule ovate-oblong. Teeth 16, purple, cleft into two equal parts.

9 b. *Capsule erect, oval or somewhat pyriform.*
13 a. *Plants of small size, stem short.*

Weisia. Plants cespitose or pulvinate. Leaves lanceolate or linear-lanceolate and subulate, costate, twisted when dry. Capsule long-stalked. Teeth 16. Lid beaked.

13 b. *Plants of considerable length, consisting of long creeping stems bearing very short, erect, fertile branchlets.*

Drummondia. Plants forming wide appressed mats. Leaves crowded, reflexed or squarrose when moist, sub-imbricate or crispate when dry, costate, opaque in the upper part, hyaline at the base. Capsule on an erect stalk. Teeth 16. Lid with a straight beak.

5 c. *Teeth* 32.
14 a. *Teeth thread-like, arising from a tessellated membrane, entirely free above, twisted to the left.*

Barbula. Plants cespitose or pulvinate. Leaves gradually lengthening from the base of the stem upward, diaphanous in the lower part. Capsule erect, oval or cylindrical, stalked.

14 b. *Teeth adhering by their points to the membrane-like top of the columella.*
15 a. *Leaves not clasping at the base.*

Atrichum. Plants densely gregarious or cespitose, dividing mostly by basilar innovations or in male plants from the centre of the flowers. Leaves ligulate, crispate when dry, narrowly margined, acutely serrate, costa sub-terete, lamellate. Capsule oval or cylindrical, cernuous or arcuate. Lid long-subulate-beaked. Calyptra toothed at the apex, cucullate.

15 b. *Leaves clasping at the base.*

Pogonatum. Plants gregarious, short and simple or robust and long with dendroid ramification. Leaves open, unaltered by moisture, costa covered with numerous lamellæ, occupying much of the lamina, rendering the leaves hard and coriaceous, margin spinulose serrate. Capsule oblong, cylindrical, erect or cernuous. Teeth orange in the middle. Calyptra cucullate, very hairy.

5 d. *Teeth* 64.

Polytrichum. Plants growing in wide and large tufts, from radiculose creeping shoots. Stems erect, simple, woody, triangular, the male plants proliferous from the middle of the flowers. Leaves as in Pogonatum, with a broad costa. Capsule quadrangular or rarely hexagonal, with a short sub-globose or discoidal apophysis. Teeth attached by their points to the membrane-like top of the columella. Lid large, flat, convex or conical, with a straight beak. Calyptra cucullate, covered with long, hanging hairs.

4 b. *Peristome double.*

16 a. *Inner peristome a plaited cone.*

17 a. *Capsule on a thick stalk.*

Buxbaumia. Plants very small, growing on soil or on decaying wood. Leaves split into inconspicuous hairs at the base of the stalk. Capsule oblique-ovate or ovate oblong, ventricose, flattened on one side, on a solid erect neck; stalk red. Peristome much as in Diphyscium. Lid conical-cylindric, obtuse.

17 b. *Capsule sessile.*

Diphyscium. Stem very short, with numerous short radicles. Leaves ligulate, thick costate. Perichætal leaves larger, ovate-lanceolate thin, deeply serrate or lacerate-ciliate at the apex, costa excurrent into an awn. Capsule ventricose, ovate-conical. Outer peristome more or less rudimentary, usually with 16 notches representing teeth; inner peristome membranaceous and forming a truncate cone of 16 or 32 twisted folds. Lid conical, acute.

16 b. *Inner peristome made up of numerous separate segments.*

18 a. *Capsule spherical or nearly so, without a collum or with an indistinct one.*

Bartramia. Plants perennial. Stems erect, often forked, radiculose-tomentose below. Leaves varying from ovate-lanceolate to subulate, half-clasping or sub-decurrent at base, serrate at the apex, costa vanishing with the apex or passing above it into a point hispid on the back, opaque, yellowish-green. Capsule cernuous or rarely erect, mostly plaited, striate when dry. Lid small, convex or obtusely pointed. Calyptra cucullate, very fugacious.

18 b. *Capsule ovate or pyriform, with a distinct collum.*

19 a. *Teeth oblique, curving to the right.*

Funaria. Plants annual or reproduced by innovations, simple or branching. Leaves comparatively large, soft, costate, obcordate or spatulate, acuminate. Capsule gibbous. Sporangium much smaller than the capsule, attached by loosely entangled threads. Outer teeth very hygroscopical. Lid plano-convex. Calyptra cucullate, long-beaked, shiny.

19 b. *Teeth straight.*

20 a. *Leaves mostly crowded, of medium size, ovate or lanceolate, acute or acuminate, cells mostly small, rhomboidal-hexagonal. Capsule pyriform, collum often as long as the capsule.*

Bryum. Plants perennial, radiculose. Leaves with a solid, terete, mostly excurrent costa. Capsule on a long stout stalk. Lid convex, with a papilla.

20 b. *Leaves mostly distant, of large size, broadly ovate or obovate, blunt, sometimes abruptly acuminate; cells very large, round-hexagonal, hexagonal-oblong near the base. Capsule ovate, the short collum abruptly narrowing into the stalk.*

1 b. *Fruit cladocarpous.* (Some species of Fissidens may be found here.)

Fontinalis. Plants floating in the water, generally very long, irregularly branching or fasciculate-ramose. Leaves very con-

2 a. *Leaves without a ventral lobe at base, often 3-5-toothed, lobed or parted.*

3 a. *Inner involucre present.*

Lepidozia. Leaves and amphigastria 3-5-parted half way to the base or more.

3 b. *Inner involucre wanting.*

Calypogeia. Leaves entire or 2-toothed. Outer involucre pendant.

Trichocolea. Leaves cleft into many capillary divisions. Fructification in a fork, not pendant.

2 b. *Leaves bilobed or with a small ventral lobe at base.*

4 a. *Amphigastria wanting. Lower lobe usually convex underneath.*

Radula. Ventral lobe producing rootlets.

4 b. *Amphigastria present.*

5 a. *Amphigastria 4-5-lobed. Lobes of the leaves divided.*

Blepharozia. Leaves palmatifid or complicate, 2-lobed, each lobe divided and ciliate.

5 b. *Amphigastria entire or two-toothed.*

Madotheca. Lower lobe of leaf concave underneath. Inner involucre with a small denticulate mouth.

Frullania. Lower lobe of leaf auriculate. Inner involucre with a mucronate mouth.

1 b. *Vegetation thallose.*

6 a. *Midrib clearly apparent.*

7 a. *Inner involucre wanting or early vanishing.*

Blasia. Outer involucre wanting. Fructification apical. Thallus simple or bifid.

7 b. *Inner involucre tubular, at first terminal, at length dorsal.*

Steetzia. Thallus sinuate or lobed.

6 b. *Midrib wanting or not apparent.*

Aneura. Sporangium borne on under side of thallus near the margin; elaters unispiral, adherent to the apex of the valves.

ANTHOCEROTACEÆ. We have only the two following genera, and these are not very common: —

Anthoceros. Capsule linear or cylindric-oblong, bivalved.

Notothylas. Capsule very short, included in the involucre, oblong-spheroidal, compressed or ovate-cylindric, stalked, the stalk arising from a thickened bulb, the suture breaking in small pieces.

MARCHANTIACEÆ. The following two genera are very common: —

1 a. *Gemmæ in crescent-shaped receptacles on the back of the thallus.*

Lunularia. Thallus oblong, with roundish lobes, distinctly areolate and porose. Scales imbricate, sub-lunulate, their apex abruptly contracted into a roundish cochleariform lobe. (Introduced into green-houses, where it is always sterile.)

1 b. *Gemmæ in cup-shaped receptacles.*

Marchantia. Fruit pendant from the under surface of a large, stalked, 7 — 9-rayed carpocephalum. Inner involucre 4 — 5-lobed.

RICCIACEÆ. The following is our only common genus:

Riccia. Fruit immersed in the thallus, sessile. Spores separate from one another. Thallus at first radiately divided from the centre, which often soon decays; the divisions bifid or ditrichotomous, plane, depressed or canaliculate above, and usually convex and naked or squamulose beneath; margins either naked or spinulose-ciliate, epidermis usually distinct.

ALGÆ. Orders:

1 a. *Multicellular.*
  2 a. *Color red or reddish purple, rarely blackish, in fading becoming at times greenish.*

FLORIDEÆ. (Red seaweeds.) Sexual reproduction carposporic, non-sexual by tetraspores. (Genera not given.)

2 b. *Color from yellowish brown to olive green or nearly black.*

FUCACEÆ. (Rockweeds and their allies.) Thallus attached by a disk-like base, usually branching dichotomously, often provided with air-bladders and with cryptostomata. Organs of reproduction borne in conceptacles or cavities lined with sterile filaments, and opening by a narrow pore, these conceptacles crowded in the swollen tips of branches. Reproduction oösporic. Marine. (See page 20.)

PHÆOSPOREÆ. (Devil's Aprons and their allies.) Thallus very various in form. Never with conceptacles as in Fucaceæ. Reproduction by zoöspores. Marine. (See page 20.)

2 c. *Color grass-green.*

CHARACEÆ. (Stoneworts.) Thallus branched and rather coarse, made up mostly of cells about 1 — 3 cm. long. Often with deposits of mineral matter in the cell wall. Fruit formed of a central cell and five elongated cells wound spirally around it. (See page 21.)

CHLOROSPOREÆ. Thallus branched or simple, very various in size and habit. Reproduction by zoöspores. In fresh and salt water. (Only marine genera are here given. See page 21.)

ZYGNEMACEÆ. (Brook-silks.) Thallus consisting of an unbranched delicate thread made up of a chain of small cells of uniform size. Chlorophyll sometimes disposed in spiral bands. Reproduction by the conjugation of stationary cells to form zygospores. In fresh water. (Genera not given.)

1 b. *Unicellular; mostly of microscopic size; cells often united into a colony.*

3 a. *Color bluish or purplish green.*

CYANOPHYCEÆ. Often more or less gelatinous. Reproduction entirely non-sexual. (Genera not given.)

3 b. *Color yellowish or orange.*

DIATOMACEÆ. (Diatoms.) Cell-wall composed almost entirely of silex. Sexual reproduction by zygospores. (Genera not given.)

3 c. *Color grass green.*

DESMIDIACEÆ. (Desmids.) Cell-wall without silex. Cells usually divided into symmetrical halves by a deep constriction. Sexual reproduction by zygospores. (Genera not given.)

CHLOROPHYLLOPHYCEÆ. Cell-wall without silex, often more or less gelatinous. Cells often imbedded in a jelly. Not constricted as in Desmidiaceæ. Reproduction entirely nonsexual. (Genera not given.)

FUCACEÆ. Genera:

1 a. *Thallus composed of a well-marked stem-like portion and distinct leaf-like appendages.*

Sargassum. (Gulf-weed.) Air-bladders distinctly stalked. (Occurs south of Cape Cod and in the Gulf Stream.)

1 b. *Thallus without leaf-like appendages.*

Fucus. Branches of the thallus flattened, with a midrib. Receptacles terminal, continuous with the frond. Often with air-bladders.

Ascophyllum. Midrib wanting. Receptacles on special lateral branches. With air-bladders.

PHÆOSPOREÆ. Genera:

1 a. *Thallus flat and leaf-like.*
  2 a. *With a midrib.*
    3 a. *Frond perforated with numerous holes.*

Agarum. (Sea-colander.) Frond stalked. Plant growing in deep water, often washed ashore during storms.

3 b. *Frond not perforated.*

Alaria. Frond stalked, having a few ecostate laminæ borne like leaflets below the main lamina.

2 b. *Without a midrib.*
  4 a. *Frond leathery, stalked.*

Laminaria. (Devil's Aprons.) Fronds attached by a branching base.

4 b. *Frond thin, subsessile.*

Punctaria. Fruit forming dots on the surface of the frond.

1 b. *Thallus forming a crust or expanded pellicle on the substrate.*

Ralfsia. On rocks and wood-work.

1 c. *Thallus tubular, not branching.*

5 a. *Thallus densely clothed with hairs,* 1—12 *feet long.*

Chorda. Thallus with numerous diaphragms.

5 b. *Thallus destitute of hairs, shorter.*

Scytosiphon. Thallus constricted at intervals.

CHARACEÆ. The following two genera are our only common ones: —

Chara. Fruit with a crown formed of a single whorl of five cells. Antheridia below the fruit-body.

Nitella. Fruit with a crown formed of two whorls, of five cells each. Antheridium terminal upon the single node of the primary leaf-like branch.

CHLOROSPOREÆ. Only marine genera are here given.

1 a. *Frond membranaceous, flat or in the form of a tube.*

Ulva. (Sea Lettuce.) Frond simple or branching.

1 b. *Frond filamentous. Destitute of hyaline hairs.*

2 a. *Filaments branching.*

Cladophora. Branches distinct.

Rhizoclonium. Branches small and rootlike.

2 b. *Filaments not branching.*

Chætomorpha. Rather coarse algæ, filaments more or less rigid. Often twisted together.

Ulothrix. Small algæ, filaments soft and flaccid.

FUNGI. Orders:

1 a. *Plant body consisting of mycelium, often more or less modified in certain parts.*

2 a. *Reproduction by basidiospores borne on or in a mostly highly developed sporocarp.*

3 a. *Sporocarp closed at least until the ripening of the spores, bearing the hymenium in one or more cavities in the interior.*

GASTEROMYCETES. (Puff-balls and their allies.) (See page 24.)

3 b. *Sporocarp with an exposed hymenium, on the surface of which the spores are developed.*

HYMENOMYCETES. (Toad-stools and their allies.) Sporocarp not gelatinous. (See page 25.)

TREMELLINEÆ. Sporocarp gelatinous. (See page 28.)

2 b. *Reproduction by ascospores. Sporocarp often highly developed.*

DISCOMYCETES. (Cup-fungi and their allies.) Sporocarp of various forms, such as club-shaped, cup-shaped, saucer-shaped, etc., either closed at first and soon becoming wide open, bearing the hymenium on its exposed inner side, or the hymenium covering from the first the exposed surface of the sporocarp, or at least the upper part of it; mostly fleshy. (See page 28.)

PYRENOMYCETES. Sporocarp spheroidal, pyriform, flask-shaped or elongated, opening only by an ostiole or a two-lipped mouth, mostly carbonaceous. (Genera not given.)

PERISPORIACEÆ. Sporocarp mostly spheroidal, not opening by an ostiole but dehiscing irregularly, membranaceous, coriaceous or carbonaceous, usually sessile on a well-developed, persistent mycelium which is always superficial. (Genera not given.)

2 c. *Reproduction never by basidiospores or by ascospores.*

4 a. *Mycelium with partitions. Reproduction never oösporic.*

UREDINEÆ. (Rusts and their allies.) Mycelium parasitic in the tissues of the higher plants. Spores formed by constriction at the ends of special hyphæ, appearing mostly in clusters forming small spots on the leaves and stems; sometimes para-

physes are mingled with the spores, or each spore-cluster may have a special receptacle. (Genera not given.)

USTILAGINEÆ. (Smuts.) Mycelium parasitic in the tissues of the higher plants. This develops certain specialized branches, which mostly become gelatinous and transform a portion of their contents into spores. The mass of spores thus formed bursts through the epidermis often as a soot-like powder. (Genera not given.)

4 b. *Mycelium mostly without partitions except at the place of fruiting.*

5 a. *Sexual reproduction by oöspores.*

SAPROLEGNIACEÆ. Mostly aquatic and saprophytic on decaying animals or plants. Non-sexual reproduction by zoöspores.

PERONOSPOREÆ. (Leaf-rots and mildews.) Parasitic in the higher plants. Non-sexual reproduction by conidia, which on germinating may produce zoöspores.

5 b. *Sexual reproduction by zygospores.*

MUCORINI. (True moulds.) Saprophytic or parasitic on other fungi. Non-sexual reproduction by conidia or clamydospores. Not aquatic.

1 b. *Plant-body consisting of a plasmodium which in fruiting becomes transformed into one or more sporangia filled with spores usually intermingled with a capillitium, but not in any way connected with it.*

MYXOMYCETES. (Slime-moulds.) (Genera not given.)

1 c. *Plant-body consisting of a single unbranched cell. Several such cells may be joined together temporarily, forming a colony. Reproduction entirely non-sexual.*

BACTERIACEÆ. (Bacteria.) Multiplication by fission. Causing putrefaction, fermentation, and other chemical changes. (Genera not given.)

SACCHAROMYCETES. (Yeasts.) Multiplication by budding. Causing alcoholic fermentation. (Genera not given.)

GASTEROMYCETES. Genera:

1 a. *Peridium cup-shaped, opening at maturity and exposing several peridiolæ; often resembling a miniature nest full of eggs.*

Nidularia. Peridium spheroidal, without a veil, rupturing irregularly at the apex and becoming cyathiform; peridiolæ stemless.

Crucibulum. Peridium crucible-shaped, closed at first by a drum-head-like veil (formed by the inner peridial layer) which finally disappears, margin not limbate; peridiolæ attached by thread-like stalks.

Cyathus. Peridium cyathiform, margin limbate; otherwise as in Crucibulum.

1 b. *Peridium at first globular, opening and cut into teeth at the margin. Outer and inner peridia joined together only by the tips of the teeth. In the peridium lies loosely a single peridiolum. At maturity the inner peridium arches upwards with a jerk, shooting forth the peridiolum for some distance.*

Sphærobolus. The plants of this genus are of quite small size, and are found mostly on rotten wood.

1 c. *Peridium rupturing at maturity when the gleba emerges covered by the inner peridium.*

Phallus. (Stink-horn.) Outer peridium rupturing irregularly; the gleba elevated on a long stalk. Finally the gleba and inner peridium become transformed into a slimy mass, which, together with the spores, flows down the stalk. The plant gives forth a disgusting fetid odor.

Geaster. (Earth-star.) Outer peridium rupturing radiately into hygroscopic lobes which, when dry, spread back like a star, exposing the inner peridium, which encloses a powdery mass of spores mingled with a capillitium, and at maturity opens at the summit in various ways.

1 d. *Peridium one- or two-layered, in the latter case the layers not separating from one another; gleba not emerging from the peridium, but forming with the spores a flocculent, powdery mass.*

2 a. *Peridium leathery, corky or woody. Capillitium scanty.*

Scleroderma. Peridium often strongly sculptured.

2 b. *Peridium rather fragile. Capillitium copious.*

Bovista. Sporocarp not at all stalked, smooth; mycelium not persistent at the base; capillitium with well-marked main stems giving rise to dichotomous branches attenuated at the ends.

Lycoperdon. Sporocarp more or less strongly stalked, often ornamented with granules, warts, spines, or the like; mycelium persistent as a mass of loose fibres at the base; capillitium without special main trunks.

HYMENOMYCETES. Genera:

1 a. *Hymenium spread over the surface of definitely shaped cavities or outgrowths from the underside of the mostly pileate sporocarp.*

2 a. *Hymenium on radiately disposed, gill-like lamellæ.*

3 a. *Sporocarp fleshy, soon decaying.*

4 a. *Lamellæ thin, leaf-like, edge acute.*

5 a. *Neither pileus nor lamellæ deliquescent.*

6 a. *Sporocarp without any milky juice.*

7 a. *Veil when present not arachnoid.*

8 a. *Lamellæ not hygrophorous.*

Agaricus. Trama filamentous; lamellæ membranaceous, fragile.

Russula. Trama vesiculose; lamellæ fragile, not filled with sap.

8 b. *Lamellæ hygrophorous.*

Hygrophorus. Lamellæ rather waxy.

7 b. *Veil arachnoid.*

Cortinarius. Trama floccose.

6 b. *Sporocarp or at least the lamellæ with a milky juice.*

Lactarius. Often acrid.

5 b. *Both pileus and lamellæ deliquescent.*

Coprinus. Spores black.

4 ~~a~~b. *Lamellæ thickish, edge blunt.*

Cantharellus. Lamellæ fleshy and waxy, dichotomously branched, decurrent on the stalk.

3 b. *Sporocarp leathery or corky, persistent.*

9 a. *Pileus borne on a central stalk, which is cartilaginous or horny, differing in texture from the pileus.*

Marasmius. Lamellæ membranaceous, dry, with entire acute edges.

9 b. *Pileus stemless or with a lateral, or rarely a central stalk, which is of the same texture as the pileus.*

Panus. Pileus toughish, coriaceous-fleshy; lamellæ membranaceous-leathery, with acute entire edges.

Trogia. Pileus thin and softish; lamellæ wrinkle-like, with crisped edges.

Lenzites. Pileus corky or leathery, sessile; lamellæ leathery, simple or branched, often anastomosing freely near the hinder end, edges entire.

Lentinus. Pileus fleshy-coriaceous; lamellæ with serrate or dentate edges.

Schizophyllum. Pileus coriaceous, lamellæ with the edges split lengthwise and the halves revolute.

2 b. *Hymenium lining the cavities of tubes or in the variously shaped hollows formed by anastomosing ridges.*

Fistulina. Sporocarp tongue-shaped or spatulate, sessile or stalked, fleshy; hymenium in cylindrical tubes, free from one another on the under surface of the pileus.

l **Bo~~t~~etus.** Sporocarp consisting of a pileus borne on a central stalk, fleshy, putrescent; hymenium in tubes joined together on the under side of the pileus forming a layer which may be easily peeled off.

Polyporus. Sporocarp mostly dimidiate, sessile or with a lateral stalk, sometimes with a central one, tough, corky, leathery or woody, persistent; hymenium in long narrow, round or angular tubes joined together forming a layer.

Dædalea. Sporocarp dimidiate, sessile, corky or leathery; hymenium borne in labyrinthiform cavities.

Favolus. Sporocarp tough and somewhat fleshy, dimidiate, scarcely stalked; hymenium in cavities formed by thick lamellæ anastomosing into a network on the under side of the pileus.

Merulius. Sporocarp extended over the substrate, soft and wax-like, fleshy or coriaceous, mostly damp or covered with drops of water; hymenium in shallow, sometimes gyrose cavities formed by a network of ridges on the upper surface of the sporocarp.

2 c. *Hymenium on spine-like, tooth-like, comb-like or papillate outgrowths.*

Irpex. Sporocarp extended over the substrate or more or less pileate, leathery; hymenium on pointed teeth which at the base are connected by a membrane.

Hydnum. Sporocarp various in form, either extended over the substrate or dimidiate-pileate, sessile or laterally stalked, or erect and umbrella-shaped, or funnel-form with central stalk, or branched and fruticulose; hymenium on spines which are subulate and crowded, but free from one another even to the base.

1 b. *Hymenium spread over more or less of the surface of the smooth or wrinkled or at most somewhat warty sporocarp (or what answers to sporocarp).*

10 a. *Sporocarp either erect and more or less pileate, funnel-shaped or fan-shaped, and the hymenium borne on the under side; or the sporocarp may extend over the surface like a crust when the hymenium is borne on the upper or exposed surface; or the sporocarp may be absent, the hymenium arising from loose mycelium.*

Thelephora. Sporocarp erect or horizontal and dimidiate, stalked or sessile, leathery; hymenium similar in texture, not separated by an intermediate layer.

Stereum. Sporocarp dimidiate, more or less pileate, mostly sessile, leathery or woody, often zoned; hymenium on the under surface, firm and leathery, separated from the rest of the sporocarp by an intermediate layer.

Hymenochæte. Sporocarp as in Stereum; hymenium covered with minute bristle-like projections.

Corticium. Sporocarp spread over the substrate, often crustaceous, woody, corky, fleshy, or floccose-tomentose; hymenium hard, often cracked by seams, not separated from the rest of the sporocarp by an intermediate layer.

Exobasidium. Sporocarp absent, the whole plant-body consisting only of mycelium penetrating the tissues of living plants producing distortions often of considerable size and forming an hymenium at the surface of the distortion.

10 b. *Sporocarp erect, cylindrical, club-shaped or branched and coral-like; hymenium produced on all sides of the upper part or over the whole surface of the sporocarp.*

Clavaria. Sporocarp cylindrical, club-shaped or branched and coral-like, mostly without a well-marked stalk, of fleshy consistency.

Pistillaria. Sporocarp small, simple, cylindrical or club-shaped, scarcely stalked, waxy or horny, stiff.

TREMELLINEÆ. Genera:

Tremellodon. Sporocarp dimidiate, more or less pileate, often with a lateral stalk, thickly beset on the under side with spine-like outgrowths which bear the hymenium.

Exidia. Sporocarp various in form, peltate, mostly patellæform or convex disciform, on a short thick stalk; hymenium borne on the upper surface, which is papillose.

Tremella. Sporocarp very various in form, mostly irregular, lobed, wrinkled and sinuose, not papillose. Basidia roundish, 2-4-parted. Spores simple.

Dacrymyces. Sporocarp much as in Tremella. Basidia forked into two branches. Spores plurilocular.

DISCOMYCETES. Genera:

1 a. *Sporocarp large, fleshy or waxy, putrescent, vertical, stalked, bearing the hymenium on a mostly darker-colored portion, which is pileate, conical, club-shaped*

or spread out and turned back. Asci not projecting beyond the paraphyses.

Morchella. Hymenium-bearing portion of the sporocarp conical, ovoid or seldom almost spherical, having the surface made up of pit-like depressions between a network of elevations; stalk hollow.

Helvella. Hymenium-bearing portion of the sporocarp, mitriform to bell-shaped, the margin being turned over and downwards, irregularly lobed, swollen and bladder-like, surface smooth or uneven; stipe mostly hollow and chambered.

Geoglossum. Hymenium-bearing portion of the sporocarp tongue-like, blunt, somewhat compressed, well marked off from the stipe.

1 b. *Sporocarp waxy, soft or fleshy, putrescent, cyathiform, bowl-shaped, saucer-shaped, or cushion-shaped; hymenium on the upper or concave surface, mostly colored darker than the rest of the sporocarp, or at least of a different color. Asci not projecting beyond the paraphyses.*

Peziza. Varying from about one millimetre to several centimetres in diameter. Often highly colored.

1 c. *Sporocarp gelatinous or sub-gelatinous, cyathiform, bowl-shaped or cushion-shaped. Asci when mature projecting beyond the paraphyses.*

Ascobolus. Sporocarp, sessile or short stalked, when mature cyathiform or bowl-shaped, with a distinct border, never over a few millimetres broad; hymenium punctate from the projecting dark-spored asci. Growing almost exclusively on excrement.

Bulgaria. Sporocarp much as in Ascobolus, often cushion-shaped, about one to two centimetres broad; hymenium uniformly black. Growing on old logs.

LICHENES. Genera:

1 a. *Apothecia with an exposed hymenium.*

2 a. *Apothecia circular or nearly so, margined (at least when young) by a thalline exciple; hymenium concave, or becoming convex with age.*

3 a. *Thallus not gelatinous when wet.*

4 a. *Thallus fruticulose, alike on all sides.*

5 a. *Thallus with the branches terete, or nearly so.*

Usnea. Thallus mostly pale green, with the branches traversed by a tough medullary cord. Apothecia usually sub-terminal, peltate, the margin radiately fibrillose.

Alectoria. Thallus mostly brown or straw-color, with the branches hollow or filled with a loose cottony medulla. Apothecia (rare) lateral, innate sessile, the margin entire.

5 b. *Thallus with the branches compressed.*

Ramalina. Apothecia sub-pedicillate; disk pale.

4 b. *Thallus fruticulose or foliaceous, showing a difference between upper and under side (except rarely in Evernia).*

6 a. *Apothecia obliquely attached to the tip of a branch or lobe.*

Cetraria. Disk colored differently from the thallus.

6 b. *Apothecia sub-pedicillate.*

7 a. *Spores ellipsoid or oblong.*

8 a. *Spores simple, colorless.*

Evernia. Thallus fruticulose or pendulose, softish, with a cottony medulla.

Parmelia. Thallus foliaceous or foliaceous-fruticulose, membranaceous, the medulla comparatively compact.

8 b. *Spores usually polar-bilocular, colorless.*

Theloschistes. Disk yellowish-orange to orange-red. Thallus yellowish, greenish or orange, fruticulose or foliaceous.

8 c. *Spores bi-plurilocular, brown.*

Physcia. Hypothecium white. Thallus foliaceous or fruticulose.

Pyxine. Hypothecium black. Thallus crustaceous-foliaceous. Apothecia soon becoming convex and black all over, obscuring the exciple.

7 b. *Spores fusiform or acicular.*

Sticta. Thallus foliaceous, mostly ample, frondose and coriaceous-cartilaginous, often with cyphels below.

6 c. *Apothecia adnate to the surface of the thallus near the margin, often on special erect lobes.*

Peltigera. Apothecia borne on the upper surface of the thallus.

Nephroma. Apothecia borne on the lower surface of the thallus.

4 c. *Thallus crustaceous, mostly uniform, sometimes lobulate, rarely crustaceous-fruticulose.*

Placodium. Differs from Theloschistes only through its crustaceous thallus.

Lecanora. Differs from Parmelia only through its crustaceous thallus.

Pertusaria. Apothecium usually consisting of several hymenia (easily to be mistaken for angiocarpous ones), all imbedded in a much swollen thalline exciple common to them all. Spores usually less than eight in an ascus, mostly of comparatively large size.

3 b. *Thallus gelatinous when wet.*

Collema. Thallus foliaceous or sometimes ascendant and fruticulose, mostly dark green, the cortical layer usually indistinct; gonidia in chains dispersed through the thallus.

Leptogium. Thallus mostly lead-colored, cortical layer distinctly parenchymatous, otherwise as in Collema.

2 b. *Apothecia circular or nearly so, margined only by a proper exciple; hymenium soon becoming convex or cephaloid, and growing over the exciple.*

9 a. *Thallus foliaceous.*

Umbilicaria. Thallus attached to the substrate at a single point. Apothecia gyrose-plicate.

9 b. *Thallus consisting of a vertical portion (podetia) which may be cylindrical and branched or simple, club-shaped or funnel-formed; and a horizontal portion which may be foliaceous, squamulose or granulose, often appearing as lateral outgrowths from the podetia. Sometimes the thallus consists only of naked, hollow podetia.*

Stereocaulon. Apothecia brown. Podetia solid, covered more or less with granules.

Cladonia. Apothecia brown, red or yellow. Podetia hollow.

9 c. *Thallus crustaceous. Apothecia borne on stalks.*

Bæomyces. Apothecia globose from the first (in our species pink or flesh color).

9 d. *Thallus crustaceous. Apothecia sessile, patellæform or cephaloid, the exciple coal-black.*

Lecidea. Spores colorless.

Buellia. Spores brown.

2 c. *Apothecium usually elongated or lirellæform, margined by a proper exciple and often also by a thalline one; hymenium concave.*

Opegrapha. Apothecia with only a proper exciple, which is usually black throughout.

Graphis. Apothecia with a proper exciple which is usually white below, and a more or less prominent thalline exciple.

2 d. *Apothecia globose or crateriform; disk consisting of a powdery mass of naked spores (the asci having early broken up).*

Sphærophorus. Thallus vertical, fruticulose. Apothecia globose, formed by the swollen tips of the branches.

Acolium. Thallus crustaceous. Apothecia crateriform or urn-shaped, sessile.

1 b. *Apothecia with the hymenium enclosed in a perithecium which opens only by a pore at the summit.* (*See Pertusaria.*)

10 a. *Thallus foliaceous, sometimes squamulose.*

Endocarpon. Apothecium indicated on the surface of the thallus only by a minute pore.

10 b. *Thallus crustaceous, often very obscure.*

11 a. *Apothecia collected many together in a convex stroma.*

Trypethelium. On bark of trees.

11 b. *Apothecia solitary.*

Verrucaria. Apothecia innate, perithecium black. On rocks.

Pyrenula. Apothecia somewhat prominent. On bark of trees. Otherwise as in Verrucaria.

GLOSSARY.

GLOSSARY.

Acicular. Needle-shaped.

Acrocarpous. With the fruit terminal on the main stem.

Acuminate. Taper-pointed.

Alate. Winged.

Amphigastria. Rudimentary stipule-like leaves arranged in a row on the ventral surface of many foliose Hepaticæ.

Anastomosing. Forming a sort of network by mutual cross-connections.

Angiocarpous (apothecia). Having the hymenium enclosed in a perithecium, which opens only by a pore at the summit.

Antheridia. The male organs of reproduction.

Apophysis. An enlargement of the stalk at the base of the capsule.

Apothecium. The spore-bearing fructification of Lichenes; the hymenium and the parts connected with it.

Arachnoid. Cobweb-like in appearance.

Arcuate. Bent like a bow.

Areolate. Divided into spaces which are often angular.

Ascospores. Spores produced in asci.

Ascus, pl. *asci.* Tiny sac-like cells containing spores, which are usually eight in an ascus.

Auriculate. Furnished with an ear-shaped appendage.

Basidia. Swollen cells giving rise to projections, each of which produces a spore at its tip.

Basidiospores. Spores produced by basidia.

Beak. A projection from the top of the lid.

Bifid. Split in two about half way down.

Bilocular. Two-celled.

Bivalved. Splitting into two valves.

Calyptra. The hood-like, membranaceous covering of the capsule and lid.

Campanulate. Bell-shaped.

Capillitium. Threads intermingled with spores, but not attached to them.

Capsule. That part of the sporogonium which contains the spores.

Carbonaceous. Having the appearance of charcoal.

Carinate. With a keel-like ridge.

Carpocephalum. A stalked receptacle bearing the sporangia in certain Hepaticæ.

Carposporic (reproduction). Fertilization of the female cell causes adjacent cells to develop a more or less complex sporocarp bearing spores.

Cartilaginous. Of the texture of cartilage or gristle; firm and tough.

Caulome. That part of a plant which answers morphologically to stem.

Cell. The unit of vegetable anatomy.

Centimeter (cm.). Equals about two fifths of an inch.

Cephaloid. Like a head; sub-spherical.

Cernuous. Nodding, with the summit somewhat inclined.

Cespitose Forming matted tufts.

Chlorophyll. The grass-green coloring matter of plants.

Chlorophyllose. Containing chlorophyll.

Ciliate. Marginally fringed with hairs.

Cladocarpous. Having the fruit terminal on short lateral branches.

Clamydospores. Spores formed nonsexually in the mycelium of Mucorini.

Cochleariform. Spoon-shaped.

Collum. The neck or tapering base of the capsule.

Columella. The central axis around which are placed the spores in the capsule.

Complanate. Flattened; lying in the same plane.

Complicate. Folded upon itself.

Compressed. Flattened laterally.

Conduplicate. Folded together lengthwise.

Conidia. Aërial spores formed nonsexually.

Conjugation. The union of two similar cells to form a third; the simplest form of sexual reproduction.

Coriaceous. Leathery in consistence.

Cortical. Belonging to, or relating to, the bark or what answers to it.

Costate. With a midrib.

Crateriform. Like a truncated cone, with a concavity at the top.

Crisped. Wrinkled into little undulations on the edges.

Crustaceous. Forming a crust over the substrate; mostly hard and brittle.

Cryptostomata. Small pits on the surface of an alga-frond, from which grow tufts of hairs.

Cuculliform. Hood-shaped, conical and cleft on one side, more or less oblique.

Cyathiform. The shape of a goblet or wine-glass.

Cyphels. Little spots, cup-like or convex in form, on the under side of certain Lichens; often whitish or yellowish.

Decurrent. Prolonged down the stem.

Dehiscing. Splitting into regular parts.

Deliquescent. Becoming when old dissolved into a semi-liquid mass.

Dendroid. Tree-like in form or appearance.

Dentate. Toothed; the teeth not oblique.

Denticulate. Minutely dentate.

Diaphanous. Transparent or translucent.

Diaphragm. A dividing membrane or partition.

Dichotomous. Two-forked.

Dimidiate. Halved, or as if one half was wanting or only partially developed.

Disciform. Depressed and circular like a disk.

Disk (of apothecium). The hymenial portion, which is often colored differently from the thallus.

Dorsal. Relating to the back.

Ecostate. Without a midrib.

Elater. Elastic spiral threads found with the spores in Hepaticæ.

Entire. Without toothing or division; the margin whole and even.

Epiphytic. Growing attached to a plant or inorganic support, but deriving no nourishment from it.

Erose. Irregularly notched as if gnawed.

Exciple. The sterile border of an apothecium.

Excurrent (costa). Extending beyond the apex of the leaf.

Exserted. Protruding above.

Falcate. Scythe-shaped.

Fasciculate (branches). Clusters of short, lateral, unequal branches.

Fibrillose. Furnished with fibrils or thread-like outgrowths.

Fibro-vascular bundles. Strings or rods of tissue forming the framework of plants and consisting of woody fibres and ducts.

Fission. The act of splitting into two equal parts.

Floccose (trama). Made up of intertangled threads, like wool.

Flocculent. Made up of little bunches of delicate woolly fibrils.

Foliaceous. Leaf-like in texture or appearance; flat and expanded like a leaf.

Foliose. Bearing leaves.

Frond. The broad leaf-like or expanded thallus of certain Algæ; also portions of a similar nature in higher plants.

Frondose. Ample and expanded like the fronds of certain Algæ.

Fructification. The fruit part of a plant.

Fruticulose. Branched and shrub-like, sometimes pendulose.

Fugacious. Falling off very early, lasting only a very short time.

Fusiform. Spindle-shaped; terete and tapering gradually to each end.

Gemmæ (in Hepaticæ). Minute masses of cells, serving for non-sexual reproduction.

Gibbous. Swelling out on one side.

Gleba. The spore-bearing tissue of the Gasteromycetes.

Globose. Spherical in form, or nearly so.

Gonidia. The imprisoned Algæ within the thallus of a Lichen.

Granulose. Composed of small grains or granules.

Gregarious. Growing in clusters, but not matted together.

Gyrose. Curved backward and forward in turns.

Hyaline. Colorless and transparent or translucent.

Hygrophanous. Presenting when fresh and moist a watery appearance.

Hygroscopic. Moving under the influence of moisture and dryness.

Hymenium. A layer producing spores.

Hypothecium. A mass of tissue just under the hymenium in some Lichens.

Imbricate. Overlapping each other like tiles or shingles on a roof.

Incubous. The tip of one leaf lying flat over the base of the next above it.

Indehiscent. Not splitting open by valves, chinks or along regular lines.

Innate (apothecium). Sunk in the surface.

Innovation. A new-formed shoot; a supplementary extension of the stem.

Involucre (in Hepaticæ). A tubular or somewhat prismatic organ surrounding the sporogonium or its base. There may be two involucres, an inner and an outer.

Labyrinthiform. With intricate turnings like a maze or labyrinth.

Lacerate. Irregularly cleft as if torn or lacerated.

Lamellate. Composed of, or provided with thin plates or lamellæ.

Lamina. The expanded part of a leaf, exclusive of the midrib.

Lanceolate. Shaped like a lance or spear-head; narrower than oblong, and tapering to each end, or at least to the apex.

Lateral. Relating to the side.

Lid. The cover of the orifice of the capsule.

Ligulate. Strap-shaped.

Limbate. With a flaring border or limb, as in an infundibuliform corolla.

Linear. Long and narrow.

Lirellæform. Elongated like a trench, often branched and sinuose.

Lunulate. Crescent-shaped.

Medulla. Pith, or what answers to it.

Medullary. Relating to the pith, or what answers to it.

Membranaceous. Thin and rather soft, and pliable like a membrane.

Meter (*m.*). Equals about three feet and a quarter.

Millimeter (*mm.*). Equals about one twenty-fifth of an inch.

Mitrate or *Mitriform.* Conical or mitre-shaped.

Mucronate. Abruptly pointed by a sharp spine-like tip.

Multicellular. Composed of many cells.

Mycelium. The filamentous tissue of fungi.

Obcordate. Inverted heart-shaped.

Ostiole. The minute orifice at the top of a perithecium through which the spores are discharged.

Oval. Broadly elliptical.

Ovoid. Egg-shaped.

Palmately (lobed or divided). In a palmate manner; *i. e.* so that the sinuses are directed towards or reach a common point, such as the point of insertion.

Palmatifid. Palmately cleft.

Papilla, pl. *papillæ.* A nipple-like projection.

Papillate. Bearing or resembling papillæ.

Papillose. Bearing papillæ.

Paraphyses. Sterile filaments accompanying asci and other reproductive bodies.

Parasitic. Growing on or in a living plant or animal, and gaining sustenance at its expense.

Parenchymatous. Having the structure of ordinary pith or parenchyma.

Patellæform. Disk-shaped or plano-convex, like the patella, or knee-pan.

Pedicillate. Stalked.

Peltate. Shield-shaped, attached by a point of its lower surface.

Pendulous. Hanging more or less as if from weakness of its support.

Percurrent (costa). Extending through the entire length of the leaf.

Perichætium. The cluster of leaves at the base of the capsule, when sessile, or of its stalk.

Peridiolum, pl. *peridiolæ.* Small peridia enclosed in a general covering.

Peridium. The general covering of a Gasteromycete.

Peristome. The fringe of teeth, etc., at the orifice of the capsule.

Perithecium. The hollow receptacle containing the hymenium in angiocarpous Lichens and in certain Fungi.

Persistent. Remaining unchanged for a considerable time after reaching maturity.

Phyllome. That part of a plant which answers morphologically to leaf.

Pileate. Having the form of a cap or pileus.

Pileus. The cap-like portion of a Fungus, that part which bears the hymenium.

Pinnately. With the parts disposed to the right and left of an axis, as barbs from the shaft of a feather.

Plant (in Mosses). Refers especially to the portion with stem and leaves.

Plasmodium. The slimy naked mass of protoplasm forming the vegetative stage of Myxomycetes.

Plicate. Folded into plaits, usually lengthwise.

Plurilocular. Consisting of several cells.

Podetium, pl. *podetia.* The erect stalk-like portion of the thallus in many Lichens.

Polar-bilocular. With two minute cells, one at each pole.

Porose. Pierced with small holes or pores.

Proliferous. Bearing progeny in the way of off-shoots.

Proper (exciple). Similar in color to the hymenium, different in texture from the thallus.

Pulvinate. Forming a cushion-shaped mass.

Punctate. Dotted.

Putrescent. Soon decaying after having reached maturity.

Pyriform. Pear-shaped.

Quadrilocular. Four-celled.

Radicles. Hair-like bodies taking the place of roots.

Radiculose. Covered with radicles.

Receptacle (in Thallophytes). A little chamber containing reproductive organs.

Revolute. Rolled backwards.

Saprophytic. Growing on or in dead organic substances and gaining sustenance therefrom.

Scarious. Thin, dry and membranaceous.

Secund. When parts or organs are all directed to one side.

Serrate. Beset with teeth that point forward like those of a saw.

Sessile. Without a stalk.

Sinuate. With a strongly wavy margin.

Sinuous. Bending in and out, serpentine or undulating in form.

Spatulate. Shaped like a druggist's spatula, oblong, with the lower end attenuated.

Sporangium. A spore-case. In Mosses it is often much smaller than the capsule containing it.

Spore. Minute bodies answering the purpose of seeds in the cryptogams.

Sporocarp. The fruit-body in Fungi; that part of the plant which produces and carries the spores, — the whole plant, exclusive of the vegetative mycelium.

Sporogonium. The capsule and its appendages, such as stalk, apophysis and the like when these are present; the non-sexual generation of the plant.

Squamiform. Shaped like a scale.

Squamulose. Made up of, or covered with, minute scales.

Squarrose. Spreading open widely and abruptly from the axis.

Striate. Marked with fine parallel lines or furrows.

Stroma. The substance in which the perithecia of some Lichens and Fungi are immersed.

Sub. As a prefix means in a slight degree, somewhat.

Substrate. That upon which a plant grows.

Subulate. Awl-shaped; very narrow and tapering to a fine point from a broadish base.

Symbiotic. Deriving mutual benefit from living together.

Terete. Round in the sense of having a circular transverse section.

Tessellated. Checkered in little squares.

Tetraspores. Non-sexual spores of the Florideæ, formed by the division of a single cell into four parts.

Thalline (exciple). Of the same substance as the thallus.

Thallose. Like a thallus, without differentiation into stem and leaves.

Tomentose. Densely pubescent, with soft woolly hairs.

Trama. The substance intermediate between hymenial surfaces, as in the gills of such Fungi as Agaricus.

Trilocular. Three-celled.

Trichotomous. Three-forked.

Turbinate. Shaped like a top.

Uniform (thallus). Neither lobed nor branched; forming a crust uniformly spread over the substrate.

Unilocular. One-celled.

Valves. Distinct portions of such organs as capsules, which become detached from one another by dehiscence in a definite manner.

Veil. A delicate membrane which shields spore-producing organs in their earlier stages.

Ventral. Used in contradistinction to dorsal.

Ventricose. Swelling unequally, or inflated on one side.

Vesiculose (trama). As if composed of little bladders.

Zoöspores. The free-swimming spores of certain Algæ and Fungi.

Zygospore. A spore resulting from the conjugation of two similar cells.

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